

Value Analysis Branch



VALUE ANALYSIS ANNUAL REPORT

FY 1998/1999



INTRODUCING THE CALTRANS 1998/1999 VALUE ANALYSIS ANNUAL REPORT

Once again it is time to report on the Caltrans Value Analysis (VA) activities of the past fiscal year.

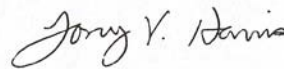
The purpose of this report is to provide Caltrans management and Project Managers with an understanding of the past and future scope and use of Value Analysis in Caltrans. It will also be made available to our transportation partners in AASHTO, FHWA, and our local transportation authorities.

Several Caltrans top-level managers attended this year's Annual Value Analysis Coordinators' Meeting in Sacramento. The general consensus was that the Statewide VA Program rates very highly in comparison to the efforts of most other states. The valuable insights offered by the Caltrans' managers are included near the end of this report under the heading - - New Direction.

It is clear that the Caltrans VA Branch has broken ground in several new areas:

- The FY 98/99 VA Program's results were excellent and include 110 accepted VA study recommendations from the 25 highway project studies. Total dollar value savings of accepted ideas and alternatives added to \$117 million, second in the nation. Furthermore an additional \$112 million in long term life cycle savings were realized.
- A year long, concerted effort was made to develop and publish various guides and manuals that will, in the long run, make the planning, leading, training, gathering of implementation results, and ultimate reporting of VA study results much easier and at the same time, more comprehensive.
- A website was established to make it easier for Caltrans employees and others to log on and find out what is going on in the VA area of the Department. The website provides electronic access to our guides and manuals.
- Several improvements were made to the existing VA database to make the end of the year gathering of study information and implementation results more effective.
- A new methodology was initiated to show meaningful performance measures for VA recommendations. The goal is to relate the ideas to the criteria established at the beginning of the study to compare the current project to the VA recommendations. This enables the pursuit of cost increasing recommendations that can be justified in terms of project performance improvements; i.e., a greater value.

As you review the report, please take note of the positive impact VA process studies have had on the Department. Process studies completed in FY 99 include: the computer help desk study in District 7; a vegetation control study, a right of way condemnation study and a water management study in District 11. The VA process studies enable specific Caltrans work areas to investigate and improve their own performance and to better serve their identified customers.



TONY V. HARRIS
Chief Deputy Director

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VALUE ANALYSIS OVERVIEW

WHAT IS VALUE ANALYSIS?

Value Analysis/ Value Engineering is a function-oriented, systematic team approach, used to analyze and improve value in a product, facility design, system or service. It is a powerful methodology for solving problems and/or reducing costs while improving performance/quality requirements.

The VA Job Plan is an organized plan of action for accomplishing VA studies and assuring the implementation of the recommended changes. Below are summarized the 12 steps, as employed in Caltrans' VA Program, required to successfully complete a VA study. It begins with Initiate Study and ends with Publish Results.

Preparation	Study	Report
<ul style="list-style-type: none">• Initiate Study• Organize Study• Prepare Data	<ul style="list-style-type: none">• Inform Team• Analyze Functions• Create Ideas• Evaluate Ideas• Develop Alternatives• Critique Alternatives• Present Alternatives• Assess Alternatives• Resolve Alternatives• Present Results	<ul style="list-style-type: none">• Publish Results

WHY USE VALUE ANALYSIS?

MAINTAIN FEDERAL FUNDING - Value analysis studies are required on all projects greater than \$25 million (construction, right of way, and capital outlay costs) on the National Highway System (NHS). The NHS Act of 1995, the subsequent Federal Rule (February 1997- Subpart 627) and the Federal Aid Policy Guide, which added a new Chapter 6- "Value Engineering" define the application of this regulation.

BUILDING CONSENSUS WITH OUR TRANSPORTATION PARTNERS - Value Analysis is an effective tool to break down conflicts and build consensus with project stakeholders and partners.

SOLVING DIFFICULT TRANSPORTATION PROBLEMS - Value Analysis enables study teams to focus on and solve difficult transportation problems. The VA team can provide an in-depth analysis and subsequent innovative solutions for the project.

IMPROVING PROJECT COSTS AND PERFORMANCE - Value Analysis studies measure both project costs and performance. Project costs should include the total cost of ownership, which includes both the original (construction) cost and subsequent operation and maintenance costs. VA recommendations recognize the relationship between performance and costs jointly determine project value improvements.

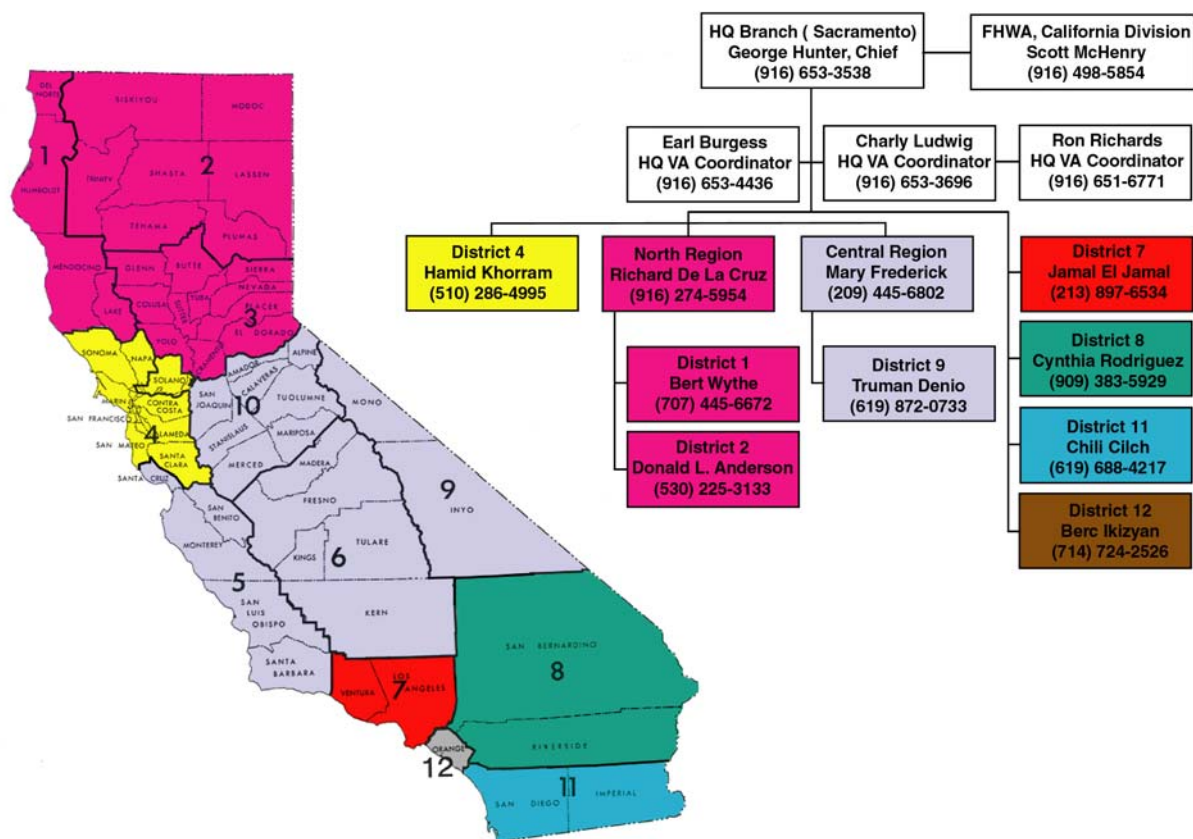
VA PROGRAM ORGANIZATION

VA Program Mission: Promote Caltrans' project and process improvement through proper and consistent application of the VA methodology.

VA Program Vision: Value Analysis to be recognized and accepted throughout Caltrans so that it is routinely applied to Projects & Processes and to be the leader in the application of Value Analysis in the transportation industry.

VA Website Address: <http://www.dot.ca.gov/hq/oppd/value/>

The following chart displays the VA Program personnel in Headquarters and the Districts:



1998/1999 PROGRAM HIGHLIGHTS

Value Analysis Studies:

- FY 1999 Highway project studies. 30 VA highway project studies were initiated in FY 99; of these, 14 were closed out along with 11 additional studies initiated in previous fiscal years. These 25 studies, 24 NHS mandated studies and 1 voluntary study, generated \$117 million in implemented construction cost savings against project costs of \$2.04 Billion. Furthermore, \$112 million in additional life cycle cost savings were reported as implemented by Project Managers.
- FY 1999 Process studies. 6 process studies were begun in FY 99, 4 of them were closed out, which included: the computer help desk study in District 7; a vegetation control study, a right of way condemnation study and a water management study in District 11.

VA Program Events:

- The FY 1999 District Value Analysis Meeting was held Sept 13-15, 1999 at the Sheraton Sacramento Hotel. This meeting was well attended by Value Analysis Coordinators and both District and Headquarters Management and included an awards ceremony.
- In July 1999 the VA Program participated in the AASHTO VE Conference in Branson, Missouri where the Caltrans VA Program received two awards. In December 1999 Caltrans accepted the hosting duties for the upcoming July 2001 AASHTO VE Conference, tentatively planned for San Diego. Caltrans has been an active member of the AASHTO VE Task Force since its inception in 1985.

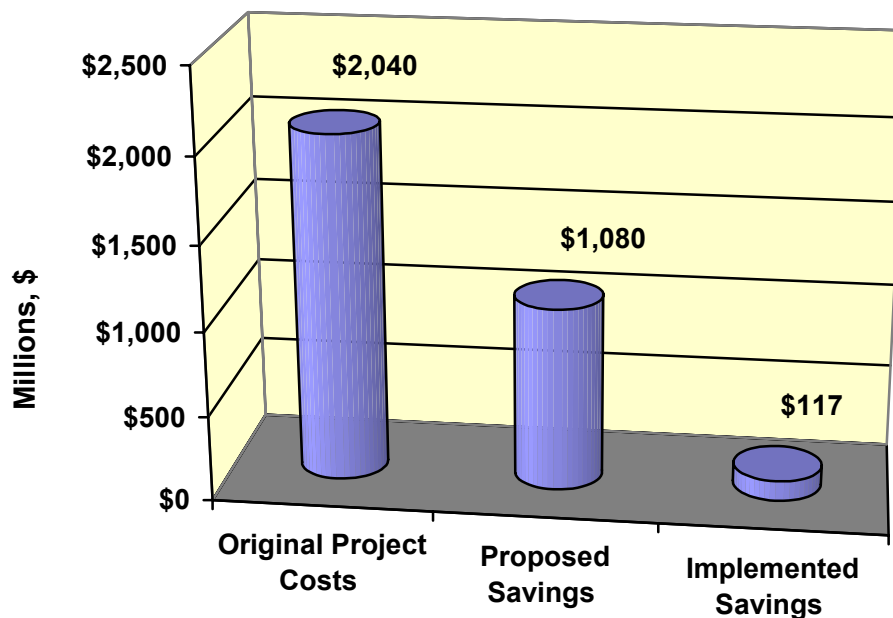
1998/1999 STUDY RESULTS

For the fiscal year ending June 30, 1999 Caltrans completed the following value analysis activities:

- Twenty-nine (29) studies were completed: twenty-five- (25) highway project studies and four (4) process studies. Twenty-four (24) of the highway studies were NHS. One was District voluntary. An additional seventeen (17) highway project studies were performed that will be reported next year.
- Caltrans' \$117 million in implemented savings ranked it second in the nation.
- Nineteen (19) Cost Reduction Incentive Proposals (CRIP), otherwise known as Value Engineering Change Proposals (VECP), were submitted by contractors resulting in \$442,452 State's share savings (50%).

Table 1
Mandatory NHS VA Studies – FY '99

No. Studies	Original Project Costs	Value Analysis Alternatives				Team Study Cost	Return on Investment
		Proposed		Implemented			
	(\$ Billion)	No.	Savings (\$ Billion)	No.	Savings (\$ Million)	(\$ Million)	
25	\$2.04	336	\$1.080	110	\$117	\$1.25	94:1



FY 99 Highway Study Implemented Results											
Description	Alternative		Savings			Study Statistics					
	Proposed	Accepted	Initial Costs	Life Cycle	Project Costs	Total Study Costs	Initial Project Cost Reduction	ROI (Initial Costs)	Implementation Rate	NHS (Y/N)	Carryover Studies (FY 98)
2-SHA-89	3	2	\$4,305,000	\$5,424,000	\$30,750,000	\$51,261	14%	84:1	67%	y	n
3-SAC-80	10	4	\$731,000		\$22,744,000	\$53,346	3%	14:1	40%	y	n
3-BUT-149	15	8	\$7,754,000		\$16,475,000	\$49,783	47%	156:1	53%	y	n
4-ALA-238	22	10	\$15,946,312		\$147,148,000	\$63,777	11%	250:1	45%	y	y
4-ALA-880	12	5	\$2,900,000		\$23,917,000	\$50,217	12%	58:1	42%	y	n
6-FRE-180	13	1	\$824,500		\$107,612,000	\$30,231	1%	27:1	8%	y	y
7- LAVEN-TOS	12	6	\$0	\$2,078,000	\$74,000,000	\$74,835	0%	:1	50%	y	n
7-LA-5 (Widen)	19	9	\$11,943,478		\$176,636,000	\$38,615	7%	309:1	47%	y	y
7-LA-5 (Scour)	24	4	\$1,572,000	\$4,500,000	\$27,266,000	\$70,271	6%	22:1	17%	y	n
7-LA-47	5	0	\$0	\$0	\$29,400,000	\$36,815	0%	.0:1	0%	y	n
7-LA-60	21	6	\$17,425,628		\$82,308,000	\$48,745	21%	357:1	29%	y	n
7-LA-405	9	7	\$1,610,230	\$5,115,000	\$83,383,000	\$54,950	2%	29:1	78%	y	n
8-SBD-15	29	11	\$7,806,000	\$8,243,200	\$135,297,000	\$68,447	6%	114:1	38%	y	n
8-RIV-215	26	4	\$11,127,000		\$272,960,000	\$85,309	4%	130:1	15%	y	y
11-SD-15	15	6	\$10,179,289	\$94,026,000	\$333,782,000	\$42,793	3%	238:1	40%	y	n
11-SD-76	12	5	\$4,373,000	\$100,062,000	\$108,209,000	\$68,545	4%	64:1	42%	y	n
11-SD-94	13	5	\$4,141,500		\$62,368,000	\$54,744	7%	76:1	38%	y	n
12-ORA-73	34	4	\$2,100,000		\$7,053,000	\$47,941	30%	44:1	12%	y	y
12-ORA-133	6	3	\$1,407,500		\$24,636,000	\$44,088	6%	32:1	50%	y	n
4-NAPA-29	10	0	\$0	\$0	\$41,220,000	\$34,831	0%	:1	0%	y	y
4-SON-101	8	3	\$3,200,000		\$44,570,000	\$27,931	7%	115:1	38%	y	y
4-SON-101	4	2	\$5,300,000		\$23,046,000	\$27,931	23%	190:1	50%	y	y
4-ALA-238	6	1	\$0		\$124,100,000	\$27,931	0%	:1	17%	y	y
6-KER-719	1	0	\$0		\$4,202,000	\$57,145	0%	:1	0%	n	y
12-ORA-90	7	4	\$2,600,000		\$37,307,000	\$37,284	7%	70:1	57%	y	y
	336	110	\$117,246,437	\$219,448,200	\$2,040,389,000	\$1,247,766	5.7%	94:1	33%	24 NHS/ 1 D.I.	5

1998/1999 AWARDS

External Awards:

- **1999 AASHTO Value Engineering Award** - The AASHTO Value Engineering Task Force awarded Caltrans the 1999 AASHTO Value Engineering Award for Most Cost Effective Proposal in Process Improvement for the “Traffic Operations Strategies of the Southern California Districts” (TOPS) study. The District Directors of the four Southern California Districts, Districts 7, 8, 11 and 12 initiated this study to develop and coordinate an approach to identify operational improvements needed to relieve traffic congestion in Southern California. George Hunter, Value Analysis Branch Chief, accepted the award at the July 1999 AASHTO National Value Engineering Award Ceremony in Branson, Missouri, on behalf of Caltrans.
- **1999 FHWA Value Engineering Award** - On July 15, 1999, the Federal Highway Administration presented three State Value Engineering awards at the 1999 AASHTO VE conference in Branson, Missouri. California was recognized as the first State Department of Transportation to demonstrate the benefits of Value Analysis, with a program started in 1969, some 3 years before the FHWA began promoting VE. The FHWA recognized Caltrans' VA Program's impressive 200 studies with over \$400 million in implemented savings over the last 5 years and for providing VA training and assistance to some of our border States in Mexico.

Internal Awards:

On June 1, 2000 a panel of Caltrans and FHWA Engineers selected District 4 as the recipient of all three VA awards. The three awards are as follows:

- The **FHWA "Most Outstanding Value Engineering Study Award"**: ALA-238 Widening Value Analysis study was selected by the panel for the FHWA's “Most Outstanding Value Engineering Study Award” for the 1998/1999 fiscal year. This is the third time District 4 has won this award. The I-238 Study surpassed all other excellent candidate projects with its creativity in problem solving, cost savings, and improvements to project quality, delivery, and safety.



**Martin Hsu - Team Leader (rest
of team not shown)**

AWARDS . . .

- The *Caltrans* "**E. Darwin Spartz Excellence in Value Engineering Award**"
Bijan Sartipi was selected as the recipient of Caltrans' "E. Darwin Spartz Excellence in Value Engineering Award" for the 1998/1999 fiscal year. This is the third time District 4 has won this award showing a long-term commitment to the utilization of Value Analysis (VA).

Bijan's commitment and support for the VA Program by his willingness to nominate his projects for VA studies over the course of many years was a significant factor for the selection by the panel. The design units under his management led the district in the number of studies for FY 1998/ 1999.

**Bijan Sartipi,
Design Chief, Peninsula**



- The Caltrans "**Value Analysis Coordinator of the Year Award**"
Hamid Khorram was selected as the recipient of Caltrans' "Value Analysis Coordinator of the Year Award" for the 1998/1999 fiscal year. This is the first time District 4 has won this award in only the second year of the life of this award.

Hamid's active four-year involvement in the VA Program and his exceptional work in partnering with the local transportation/government authorities was a significant factor for his selection by the panel.



**Hamid Khorram,
District 4 Value Analysis
Coordinator**

1999/2000 NEW INITIATIVES

FY 2000 Results:

- Highway Project Studies:
 - During fiscal year 2000, 57 highway project studies are planned with total project costs of \$2.3 Billion.
 - As of April 2000, 31 studies were either executed or on target. An additional 7 studies could reasonably be completed before the end of the fiscal year for an expected 38 studies for the year.
 - 20 studies, with project costs estimated at \$935 million were carried over into FY 2000 for implementation results. Of these 20 studies, 16 studies were begun in FY 1999 and 4 studies begun in FY 1998.
- Process Studies: 13 process studies are planned for FY 2000. Twelve studies have been executed or are on target as of April 2000. Two process studies begun in FY 1999 will be closed out.
- Product Studies: None planned for FY 2000.
- Construction: Caltrans will continue to process contractor-submitted CRIPS (Cost Reduction Incentive Proposals).

Visitors:

Caltrans welcomes international visitors from two countries, Norway and Brazil:

- Two Norwegian engineers from the county of Oppland participated in a November 1999 District 4 Caltrans study to learn how Caltrans applies the VA methodology for possible application to their own program.
- Five to fifteen Brazilian Ministry of Transportation employees will participate in Caltrans training workshops looking to start up a similar program in Brazil.

Program Improvements:

- Caltrans' VA Branch launched an Internet website in FY 2000. Four VA guides and manuals are available on the website. Three were updated by the end of FY 2000, including revised versions of the Report and Team Guides with new project performance measurements that carry VA teams through the implementation phase of VA studies. The first edition of the VA Concepts Manual now guides participants through a 40-hour training workshop. The remaining manual, the VA Procedures Manual, a tool to help administer a District VA Program, continues in development for FY 2001.
- Chapter 19, "VA Guideline" of the Project Development Procedures Manual (PDPM) was revised to reflect changes made in the new Guides and Manuals.
- The VA Branch is participating with the Construction Program in integrating a value engineering study workshop as part of the partnering workshop. A special provision is being developed to include an option on all contracts, estimated to cost \$5 million or more, to allow value engineering to take place during construction, thus, encouraging the development of project cost reductions that would benefit both the State and contractor representatives.

VALUE ANALYSIS TRAINING

After an aggressive training program last fiscal year the number of training opportunities were reduced, but have resumed in FY 99/00.

- In FY 2000 three 40-hour workshops will increase the effectiveness of team members participating on value analysis studies. There will be one each in Districts 3 and 4 and another in District 11, for a total of 135 trainees.
- Caltrans will also be providing VA Training in 6 Design Senior Academies and in 4 Project Engineer Academies.

Roger Sperling introduces the VA Team Guide to Study Participants



HISTORICAL HIGHWAY PROJECT SAVINGS

The historical savings from the Caltrans VA program are presented graphically in the following two figures. Figures 1 and 2 show the implemented savings for highway projects. Figure 3 shows the number of completed studies by District.

Figure 1
VA Highway Project Savings – FY '97 to FY '99

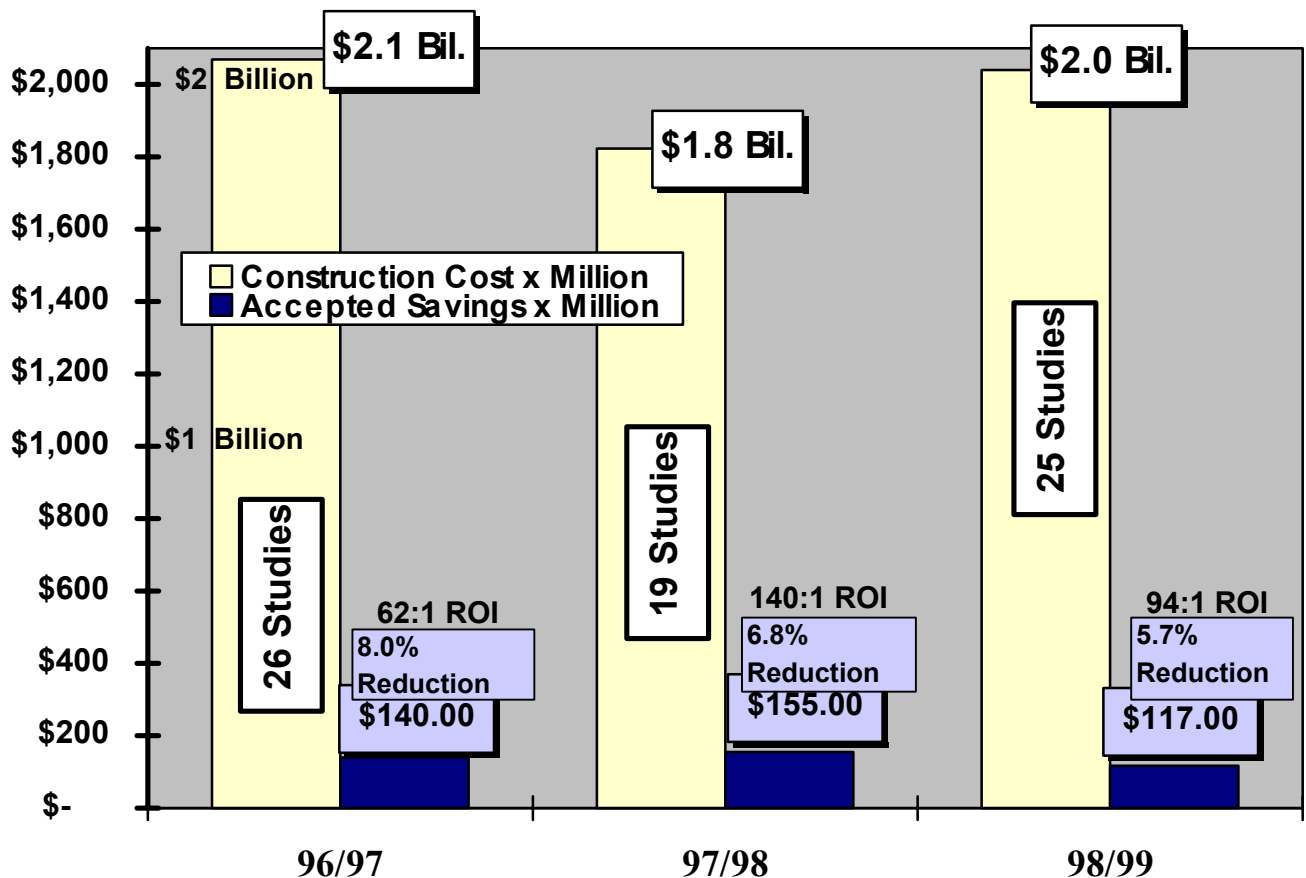


Figure 2
VA Highway Project Cumulative Savings

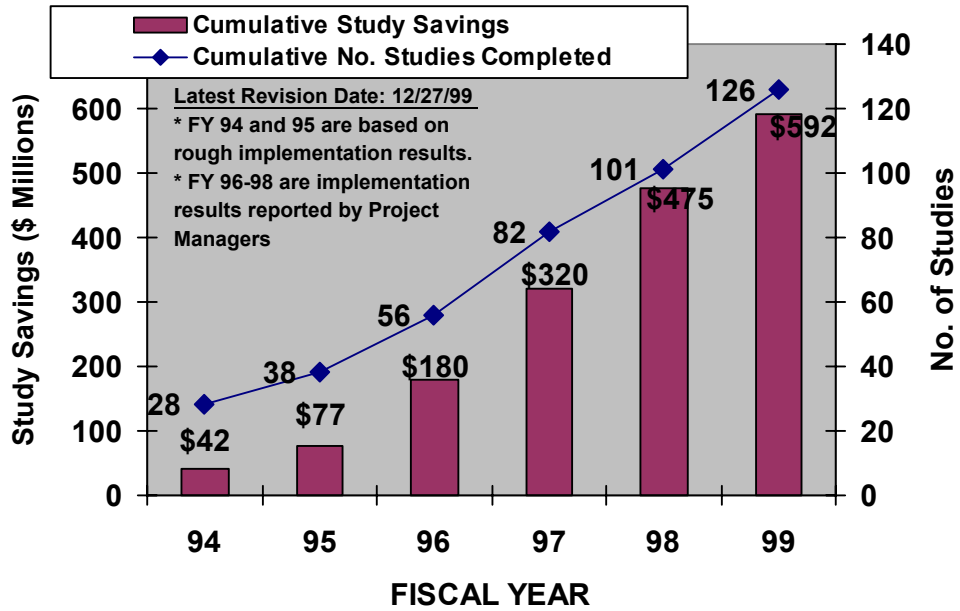
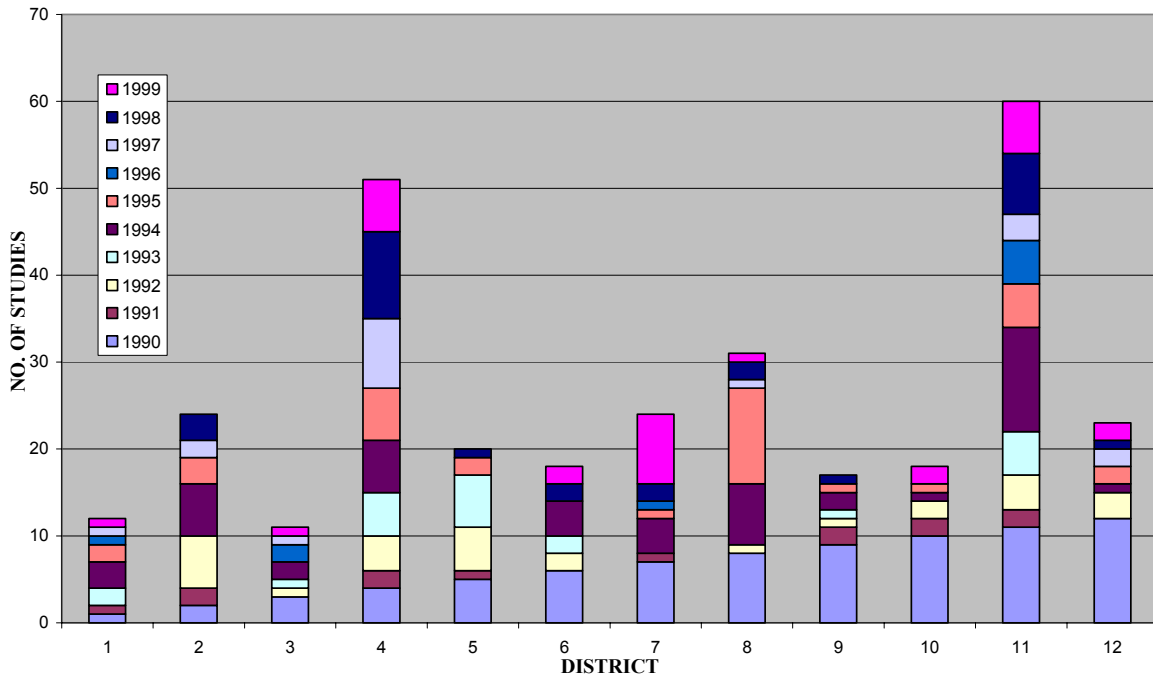


Figure 3
VA Study Completion Trend



MANDATED NHS PROJECTS

Federal legislation mandates highway projects on the NHS with project costs over \$25 million be value analyzed for federal aid participation. 359 projects, with projects costs of over \$22 Billion have been identified under this mandate. 159 projects have been value analyzed to date; an additional 200 projects still need VA studies. The federal rule defines a project as portion of highway a state proposes to construct, reconstruct or improve as described in the preliminary design report or applicable environmental document and may consist of several contracts or phases over several years. The cost threshold includes construction cost, right of way costs, and capital outlay support costs. Figure 4 shows these projects by Caltrans district. Figure 5 shows the number of projects by targeted PS&E date.

Figure 4
Mandated NHS Projects by District

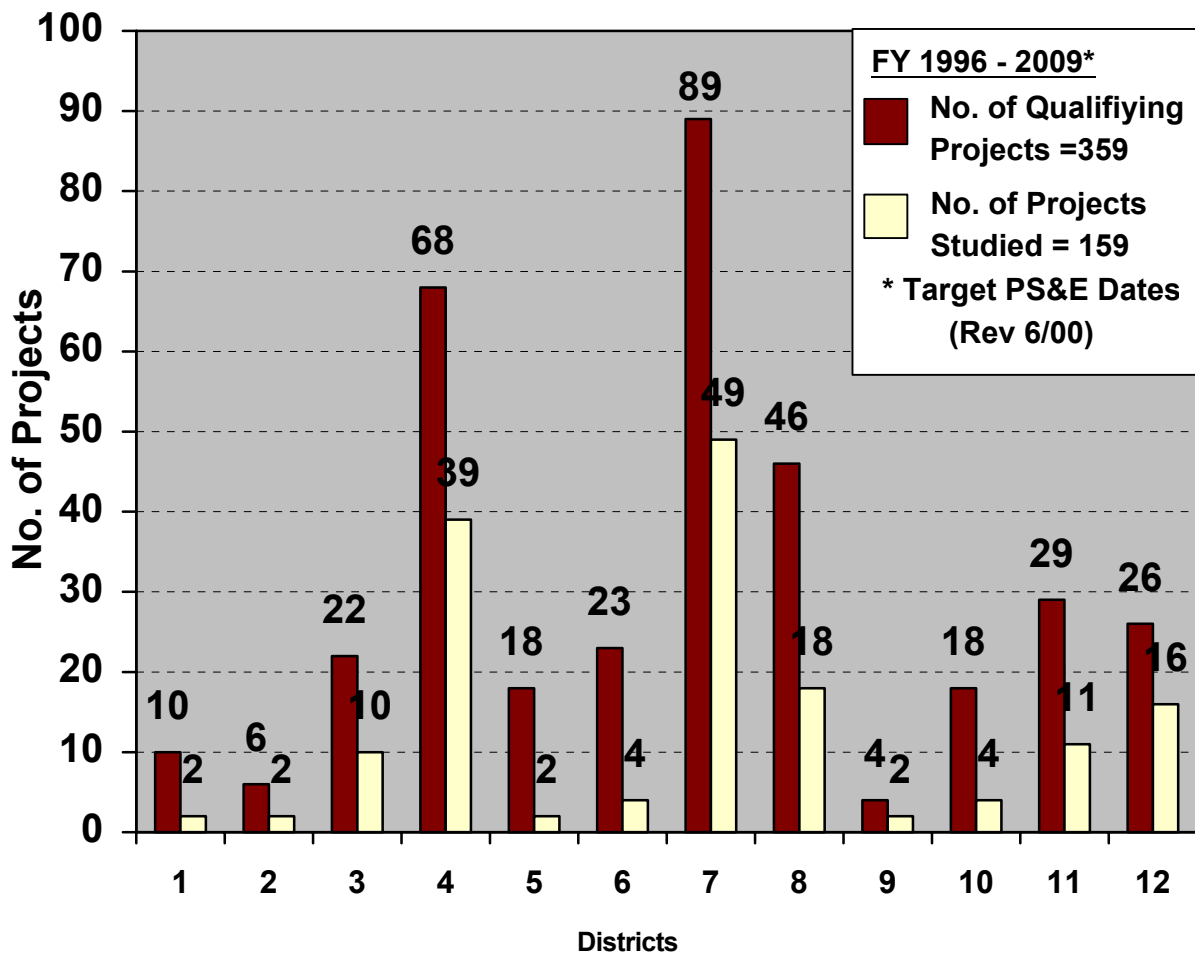
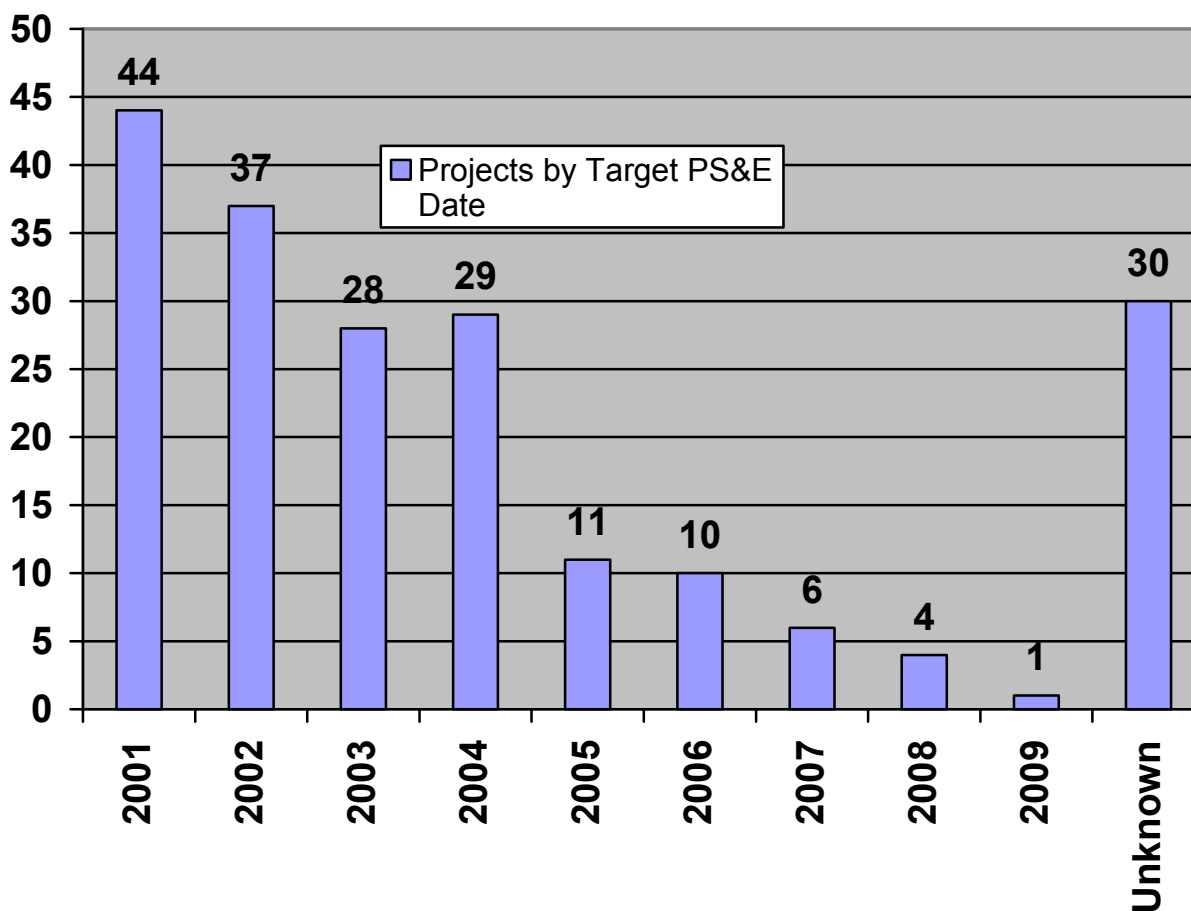


Figure 5
Mandated NHS Projects by Target PS&E (by given Fiscal Year)



NEW DIRECTION

Several Caltrans top-level managers attended this year's Annual Value Analysis Coordinators' Meeting. The general consensus was that the Statewide VA Program rates very highly in comparison to the efforts of most other states. Caltrans' managers offered the following valuable insights:

- ♦ The VA Program has strong management support. More support could be gained by issuing a formal letter from Tony Harris and/or Bob Buckley.
- ♦ A strong VA marketing plan needs to be developed for Caltrans.
- ♦ Resources for the VA program need to be aggressively pursued.
- ♦ Get management actively involved by participating on the VA teams or attending briefings/presentations).
- ♦ Performance measures for the VA program need to be developed to track results and secure funding.
- ♦ Focus on strengthening ties to project managers through VA education.
- ♦ There should be no excuse for not dedicating resources to the VA program.
- ♦ VA studies should be performed earlier due to the recent emphasis placed on change controls.
- ♦ The development of VA advisory committees should be implemented statewide.

What are the VA Program's successes?

- 1) Enthusiastic District Value Analysis Coordinators.
- 2) VA "Champions" in management.
- 3) Seen as part of the Quality Program.
- 4) VA is perceived as a tool/asset rather than as a requirement.
- 5) There are three resource opportunities:
 - a) Identification of potential alternates.
 - b) Performance of engineering studies.
 - c) Performance of preliminary design.
- 6) The application of VA has expanded to the areas of operations and management, including the development of District business plans.

What challenges does the VA Program face?

- 1) High turnover of PM's requires constant VA "re-education".
- 2) Need to filter management support from the top down.
- 3) DVAC's need to be allocated more time.
- 4) Management must "sell" VA to PM's
- 5) Performance measures for the VA program are essential for securing resources/funding

NEW DIRECTION ...

How can management be persuaded to get more involved in the VA Program?

- 1) Demonstrate the benefits of VA – disseminate this information to management.
- 2) Identify functional area resource managers.
- 3) Establish District VA steering committees to direct VA.
- 4) Encourage DVAC's to continue to “sell” the program to management.
- 5) Get management directly involved on VA studies as team members and resources.
- 6) Focus on involving mid-level management.
- 7) Focus on operations.
- 8) Identify parameters for VA studies:
 - a) Secure resources
 - b) Support DVAC's
 - c) Develop performance standards
- 9) Place more emphasis on past successes and publicize the results.